Module Three – Core skills in cancer care

Overview

The aim of this module is to develop the ability of the beginning specialist cancer nurse to demonstrate competence in the core skills required to provide nursing care for people with cancer.

Key concepts

The key concepts associate with the core skills in cancer care are listed below:

- Supportive communication principles.
- Principles of a therapeutic relationship in cancer control.
- Applying comprehensive health assessment skills in cancer control.
- Identification and management of common Oncological Emergencies:
  - Septic shock
  - Superior Vena Cava Syndrome
  - Tumor Lysis Syndrome
  - Metastatic Spinal Cord Compression
  - Hypercalcaemia
  - Disseminated Intravascular Coagulation.
- Occupational Health and Safety concepts related to radiation and hazardous substances:
  - Safety principles to limit exposure of staff to radiation
  - Hazards of cytotoxic medications and related waste
  - Possible exposure routes
  - Control measures related to cytotoxic medications and related waste
  - Management of cytotoxic waste
  - Management of a cytotoxic spill
  - Management of personal contamination.
- CVAD management:
  - Clinical indications for CVAD insertion in people affected by cancer
  - Types of CVADs used in a cancer care setting
  - Common management principles for CVADs
  - Possible complications related to CVADs.
- EdCaN Competency Assessment Tools or local competency/skills based assessment tools for:
  - Radiation safety
  - Safe handling of cytotoxic medication and related waste
  - Management of CVADs.

Learning activities

At times, you will have learning activities to complete. The questions will relate to the content you've just read or the video you've just watched.

Videos

You will be prompted to access EdCaN videos throughout this module.
Resource links

Resource links may be included throughout the module. These links lead to interesting resources, articles or websites, and are designed to encourage you to explore other available information.

Estimated time to complete

80 hours

Workplace learning requirements

The EdCaN TSP is designed to support learning within the context of the policies, procedures and preferences of individual workplaces. Completion of this module and assessment of competence in specific practice areas needs to be supported by appropriately qualified educators, preceptors and clinicians in the participant’s practice setting. Opportunities for participants to undertake supervised practice of selected skills will be required. This support is designed to promote integration of knowledge to clinical practice.

In conjunction with this learning module, it is recommended that the EdCaN Competency Assessment Tool for Antineoplastic Agent Administration is used to both facilitate the development and assessment of competence. It is anticipated that the minimum level achieved by the Beginning Specialist Cancer Nurse will be at the performance level “beginning competence as a specialist cancer nurse”. (Table 1)

An alternative competency/skills based assessment tool may be used, but it is recommended that such a tool is mapped to the EdCaN resource to ensure that it reflects the nationally recognized standard of care with respect to administration of antineoplastic therapy.
Table 1  EdCaN Competency Assessment Tool for Antineoplastic Agent Administration

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Interpretation</th>
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<tbody>
<tr>
<td>COMPETENT Beginning competence as specialist cancer nurse</td>
<td>Identifies and follows standard policy requirements with some specificity to chemotherapeutic agent or individual. Identifies and resolves unsafe situations. Nursing considerations limited to specific context but lack organisational/global perspectives. Requires occasional prompts to carry out routine processes and practice. Evolving technique demonstrated.</td>
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<tr>
<td>NOT YET COMPETENT</td>
<td>Knowledge of local policy and rationales for practice limited to recall. Limited focus on task, individual or context. Requires continuous directions or prompts to carry out routine procedures. Accuracy and technique not dependable.</td>
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Objectives

On completion of this module, you should be able to:

1. Demonstrate principles of effective supportive communication to establish and maintain therapeutic relationships with people affected by cancer.
2. Perform a comprehensive assessment to identify the impact of common disease and treatment effects on all domains of health experienced by people affected by cancer.
3. Recognise and manage the common oncological emergencies that may be experienced by people affected by cancer.
4. Describe potential hazards which impact on safe and effective care delivery in cancer care.
5. Identify evidence based strategies for ensuring personal and professional safety when caring for people affected by cancer.
6. Explain the theoretical concepts related to the common Central Venous Access Devices (CVADs) used in cancer care.
7. Demonstrate competent and safe practice in the following core skills (as relevant to practice area):
   - Radiation safety
   - Safe handling of cytotoxics
   - Management of CVADs.
Supportive communication with people affected by cancer

The way in which a health professional and the treatment team relates to, and communicates with the person affected by cancer can significantly benefit their experience. Improvements in psychosocial adjustment, decision-making, treatment compliance and satisfaction with care have been reported.¹

There are evidence-based strategies that clinicians can use to improve their communication skills. Key person-centred communication skills include:²

- empathy – acknowledging and understanding a person’s feelings, both verbal and non-verbal
- active listening – listening in an understanding way, both verbal and non-verbal
- actively encouraging questions and checking understanding – clarifying the message of the person affected by cancer
- asking open questions – encourages the person to talk
- not interrupting
- encouraging the presence of a support person – can help the person’s understanding, recall and/or satisfaction
- checking the person’s preference for receiving information – to tailor the information for the person’s needs
- using plain language – concise questions and comments without jargon
- noticing non-verbal cues – picking up on a person’s body language
- checking that the person understands what you have said – explaining adequately
- normalising – can reassure the person
- summarising – what has been said; checks that you have understood and invites the person to correct you or expand further.

Two case study scenarios are provided below to stimulate reflection on therapeutic communication strategies which may be used when responding to anger and emotional cues.

These resources were developed by Supportive Cancer Care Victoria and funded by the Cancer and Palliative Care Section of the Victorian State Government’s Department of Health in support of Victoria’s Supportive Care Policy.
Scenario one: responding to anger

Anger is a common reaction to a diagnosis of cancer and clinicians often care for people who are experiencing this emotion. Communication skills that will assist clinicians to confidently support people affected by cancer are:

- staying calm and keeping an even tone of voice
- actively listening and staying focused on the issue
- not taking the anger personally
- not being defensive
- acknowledging the anger and exploring reasons for the anger
- apologizing if it is your fault
- looking for underlying emotions and exploring further.

While viewing this scene, look out for how the clinician uses these skills.

Setting the scene
George is 40 years old and was recently diagnosed with advanced pancreatic cancer and is waiting to meet the oncologist to discuss treatment options. He is married with three children (aged 12, 10, 7).

Watch scenario 1. (Scene length - 4.30mins).

Learning activities

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<tr>
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<tr>
<td>□</td>
<td>1. Describe the verbal and non-verbal cues and behaviours demonstrated by George in the video.</td>
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<td>2. Discuss how the clinician used different communication skills within this scenario.</td>
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<td>3. Outline your response to the scenario in the event that the anger experienced by George escalated.</td>
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<td>4. Critically reflect upon your past experience with individuals demonstrating anger. Describe strengths in how you managed the situation effectively and areas you may have improved the interaction.</td>
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</table>
Scenario two: responding to emotional cues

Distress and anxiety are common reactions to a diagnosis of cancer. Skills that assist the clinician to confidently support the person affected by cancer include:\(^2\)

- normalising feelings
- allowing silence
- using minimal prompts such as yes, mmm, I see, etc.
- allowing the person to complete statements without interruption
- mirroring the words the person uses and paraphrase responses
- summarising key points
- addressing issues that magnify anxiety
- reflective body language.

Setting the scene

Joanne is 42 years old, and she has recently been diagnosed with breast cancer. She has had a wide local excision and sentinel node biopsy, followed by an axillary clearance due to positive lymph nodes. She has been told she will need radiotherapy and chemotherapy. Joanne lives with her partner Trish and Trish’s brother on a grain farm. She is a teacher at the local primary school.

Watch scenario 2.\(^4\) (Scene length - 3.33mins).

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Comprehensive health assessment skills in cancer care

Assessment forms an integral part of nursing. The priorities, needs and experiences of the person affected by cancer are a central focus of assessment and care planning. The process of assessment should be one of partnership between the care recipient and health professional. Assessment is a continuous process. Holistic assessment at key points forms part of this continuous process, and should supplement day-to-day appraisal of individual needs.

Significant points along the individual’s journey may include:
- the time of diagnosis
- commencement of treatment
- completion of primary treatment plan
- each new episode of disease recurrence
- the point of recognition of incurability
- the beginning of the end of life
- the point at which dying is diagnosed
- any other time requested by the person affected by cancer
- any other time that a professional carer may judge necessary.

Discretion should be applied to determine the most appropriate time to undertake an assessment; for example, immediately following diagnosis may be inappropriate, particularly if the individual is distressed.

Assessment should include the following ‘domains’:
- background information and assessment preferences
- physical needs
- social and occupational needs
- psychological wellbeing
- spiritual wellbeing
- information needs
- carer’s needs.

A tool such as the Patient Concerns Checklist may be used to support assessment of these domains.

Figure 2: Overview of the Holistic Needs Assessment Process provides a guide to facilitate the assessment process throughout the cancer trajectory.
Figure 2: Overview of Holistic Needs Assessment Process
(Source: *Guidelines for Holistic Needs Assessment of Adult Cancer Patients, 2010*⁶)
### Learning activities

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<tbody>
<tr>
<td></td>
<td>1. Appraise the effectiveness of the assessment tool/s in your health care facility to holistically assess an individual’s needs.</td>
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<td>2. Complete and document a holistic health assessment for a person affected by cancer.</td>
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<td></td>
<td>3. For the person assessed in the above learning activity:</td>
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<td>• Identify current needs and the assessment data that supports your decisions</td>
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<td></td>
<td>• Identify future needs which may be anticipated and the assessment data that supports your decisions.</td>
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Oncological emergencies

The following conditions are examples of oncological emergencies:

- Febrile neutropaenia and sepsis
- Superior vena cava syndrome
- Tumour lysis syndrome
- Spinal cord compression
- Disseminated intravascular coagulation
- Hypercalcaemia

Febrile neutropaenia and sepsis

Aetiology and contributing factors

Febrile neutropaenia (FN) and sepsis are distinct phenomena but are often discussed in conjunction with each other. FN is present in individuals with a temperature above 38°C for at least one hour and a neutrophil count of less than $0.5 \times 10^9$, or $1.0 \times 10^9$ with a predictable decline to $0.5 \times 10^9$. In people receiving treatment for cancer, neutropaenia may be the result of treatment with certain antineoplastic agents or the use of radiotherapy where marrow-producing bones (such as the long limb bones, the sternum and the cranium) fall into the field of radiation.

Other risk factors for FN include:

- increased age
- poor performance status
- the presence of co-morbidities like renal and heart disease.

FN can indicate infection and rapidly progress to severe sepsis if left untreated.

Sepsis is defined as an infection that causes systemic symptoms. These symptoms are caused by the body’s ‘Systemic Inflammatory Response Syndrome’, or SIRS, and may include two or more of the following:

- an abnormal temperature, either $< 36°C$ or $>38°C$
- heart rate of $> 90$ beats per minute
- respiratory rate of $> 20$ breaths per minute
- acutely altered mental state.

Severe sepsis is defined as sepsis with the addition of sepsis-induced organ dysfunction or tissue hypoperfusion. Septic shock occurs when sepsis-induced hypotension occurs despite adequate treatment. If left untreated, severe sepsis can result in death within hours.

Assessment and monitoring

In individuals affected by cancer and its treatments, the inflammatory response may be diminished or even absent. This means that for this group, the signs of SIRS may not
necessarily be present to indicate sepsis\textsuperscript{16}, and so astute nursing assessment and prompt management is vital.

Subtle signs that may indicate infection in the person with cancer may include an increase in heart rate, warm flushed skin, slight decreases in blood pressure and urine output, and slight changes in mental status.\textsuperscript{16}

A septic workup is performed when an individual is suspected of suffering from either FN or sepsis. This process involves a number of tests including:\textsuperscript{7}

- blood cultures; one set of aerobic and anaerobic bottles should be taken from each lumen of any CVAD in situ, and one set taken peripherally
- full blood count
- electrolytes and liver function tests
- urine specimen
- swab of any CVAD exit site
- swab of any other suspicious wounds
- if clinically indicated, faeces and sputum specimens
- a chest x-ray.

Resource link
The eviQ website\textsuperscript{17} contains a resource on the \textit{Immediate management of neutropenic fever}\textsuperscript{7} (This is a free resource, but you must register and log in to access).

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<tr>
<td>Completed</td>
<td>1. List the key signs and symptoms of SIRS and sepsis in a person with cancer.</td>
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<td>2. Review local policy and procedures and outline requirements for a full septic screen for a person with febrile neutropaenia.</td>
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Recommended intervention strategies

\textit{Prevention}

Sepsis in people with cancer is generally caused by gram-negative bacteria like \textit{Escherichia coli} and \textit{Pseudomonas sp.}\textsuperscript{16} In most cases, these bacteria are part of the person’s normal flora.\textsuperscript{16} Good hand washing and general personal hygiene practices remain key nursing strategies to prevent FN and sepsis.\textsuperscript{16}

People at risk of developing FN or sepsis must also receive education on:\textsuperscript{6,9}

- signs and symptoms of FN and sepsis
• actions that should be taken in the event of these signs or symptoms developing
• minimising potential exposure to infectious sources
• times at which people receiving treatment for cancer will be at their greatest risk of infection.

Management
All persons receiving treatment for cancer who present with a fever should be managed as if they are neutropenic, without waiting for laboratory confirmation of their neutrophil count. The key nursing priorities when dealing with FN or sepsis is prompt assessment using a septic workup as per local policy and procedures.

People with symptoms of sepsis should receive antibiotics within 30 minutes of presentation. For those with suspected or confirmed FN that has not yet progressed to sepsis, antibiotic therapy should, if possible, commence within one hour of presentation. Ideally, blood cultures should be collected prior to the commencement of antibiotics, in order to better identify the causative infectious agent.

Subsequent therapy should be based on the clinical findings of the tests performed and may also include the administration of intravenous fluid, blood products, oxygen, and/or vasopressors. Individuals experiencing altered mental status must also be closely monitored to ensure safety.

Other supportive management strategies undertaken by nurses include:
• monitoring the person’s response to therapy by checking vital signs regularly
• reviewing test results as appropriate
• assessing for signs and symptoms of septic shock
• supportive management of fever
• provision of information and supportive care to reduce concerns and psychological distress.

Resource links
The eviQ website contains a resource on the Immediate management of neutropaenic fever. This includes a table detailing the antibiotics that should be used to treat FN and sepsis. (This is a free resource, but you must register and log in to access).

You may also find the NCCN Guidelines on The prevention and treatment of cancer-related infections helpful. (This is a free resource, but you must register and log in to access).

Learning activities
Completed Activities
1. Develop a care plan for a person with febrile neutropenia. Discuss the rationales for nursing interventions with your mentor/facilitator.

2. Discuss the core components of an education program for the person affected by cancer to reduce the risk of sepsis.

Tumour lysis syndrome

Aetiology and contributing factors

Tumour lysis syndrome (TLS) is caused by the death, or lysis, of a large number of tumour cells. Tumour lysis can occur either spontaneously or in response to anti-cancer treatment. When cancer cells die, they release potassium, phosphorous, cytokines and nucleic acids (which are metabolised into uric acid) into the bloodstream. TLS occurs when more of these substances are released during cell lysis than the body’s homeostatic mechanisms can manage. This can cause the following metabolic imbalances:

- hyperkalaemia
- hypocalcaemia
- hyperphosphataemia
- hyperuricaemia.

These metabolic disturbances can lead to clinical toxicities including renal insufficiency, cardiac arrhythmias, seizures, and death due to multi-organ failure. Cytokine release can also cause Systemic Inflammatory Response Syndrome (SIRS) and multi-organ failure.

TLS occurs most commonly in haematologic malignancies such as leukaemias and lymphomas, and is less common in people with solid tumours. Tumour lysis can occur in response to antineoplastic therapy, but can also be the result of high doses of steroids, surgery, radiation, molecular and biological targeted therapy, and endocrine therapy. It can also occur spontaneously.

TLS has been reported to occur most commonly within the first 24 to 48 hours after the initiation of treatment for cancer, and may persist for five to seven days. Late development of TLS may also occur, with the onset of signs and symptoms occurring up to four days post treatment.
1. Summarise the pathophysiology of the development of TLS.

2. For the metabolic imbalances associated with TLS, outline:
   - the normal ranges of these electrolytes
   - the signs and symptoms of each metabolic imbalance.
Assessment and monitoring

Astute clinical assessment can help to proactively identify the persons at risk for the development of TLS. Nurses also has an important role in the administration of prescribed prophylactic therapy, aimed at preventing TLS from occurring. Individuals at risk of TLS must also undergo frequent assessment, focusing on the presence of the metabolic abnormalities discussed above and clinical symptoms of TLS.

Clinical symptoms of TLS include:

- cardiac dysrhythmias, which may be indicated by an abnormal pulse rate, irregular pulse, or abnormal blood pressure
- neuromuscular irritability, which may be evidenced by tetany, paresthesias, or muscle twitching
- oliguria, defined as an average urine output of less than 0.5mL/kg/hr for 6 hours or more.

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<td>[copy activities to your notebook]</td>
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<tr>
<td>1. Discuss the difference between laboratory TLS and clinical TLS, and how you would monitor for both.</td>
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<td>2. Describe some common psychosocial concerns and needs that people with TLS may experience. (You may find this article helpful: <a href="#">Psychosocial care for patients and their families is integral to supportive care in cancer: MASCC position statement</a>).</td>
</tr>
</tbody>
</table>

Recommended intervention strategies

**Prevention**

The best management of TLS is prevention of its occurrence. Treatment to prevent TLS may be based around a risk assessment identifying whether a person is at low, intermediate, or high risk of TLS. This treatment is outlined below.

- **Low risk**: Intravenous fluids, allopurinol, daily electrolyte monitoring.
- **Intermediate risk**: Intravenous fluids, purine analogues or a recombinant urate oxidase enzyme, electrolyte monitoring every 8-12 hours.
- **High risk**: Intravenous fluids, purine analogues or a recombinant urate oxidase enzyme, cardiac monitoring, electrolyte monitoring every 6-8 hours.
This treatment should be commenced at least 48 hours before antineoplastic therapy.
Management

In persons with established TLS, nursing management may include continuous cardiac monitoring, electrolyte monitoring every 4-6 hours, and the administration of intravenous fluids and rasburicase.\(^19\)

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<tr>
<td>1. Outline key aspects in the nursing plan for the newly diagnosed individual at risk of TLS prior to and post commencement of treatment.</td>
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Metastatic spinal cord compression

Aetiology and contributing factors

Metastases to the spinal column occur in three to five percent of all people with cancer.\(^{22}\) Metastatic spinal cord compression (MSCC) occurs when these metastases cause vertebral body collapse, or direct tumour growth causes compression of the spinal cord or cauda equina.\(^{22}\) MSCC most commonly occurs in individuals with breast, prostate, or lung cancer, with these three cancers accounting for more than 50% of the MSCC cases seen.\(^{12, 22}\) The risk of experiencing MSCC increases the longer someone has cancer.\(^{22}\) This means that as more people with cancer are surviving for longer, the incidence of MSCC may be increasing.\(^{22}\)

Common presenting symptoms of MSCC include:\(^{12, 22, 23}\)

- **Back pain**: Back pain is the most common presenting symptom of people with MSCC, occurring in up to 95% of sufferers.
- **Reduced power**: Up to 85% of people with MSCC also have reduced power in their limbs.
- **Loss of sensation**: 65% of those with MSCC suffer with loss of sensation.

These symptoms can have a devastating effect on the quality of life (QoL) of the person with cancer and their carers.\(^{23}\) People who do experience paralysis due to MSCC also have a shortened life expectancy.\(^{23}\)

MSCC can result in irreversible neurological damage.\(^{22, 23}\) Early recognition and treatment of MSCC can significantly alleviate associated morbidity and improve overall QoL.\(^{12, 22}\) A history of any of the above symptoms in a person with cancer warrants urgent investigation.

Although the majority of people presenting with MSCC do have a previous history of cancer, for some people, MSCC is the presenting complaint that leads to a cancer diagnosis.\(^{12}\)
people not previously known to have cancer, histology may be sought to confirm the primary diagnosis.\textsuperscript{12}

**Learning activity**

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<td>1. Discuss the implications of compression in different areas of the spine:</td>
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<td>• Cervical spine</td>
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<td>• Thoracic spine</td>
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<td>• Lumbar spine</td>
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<td>• Sacral spine</td>
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**Assessment and monitoring**

Nurses have an important role to play in the education of those at risk of MSCC as it is vitally important that these individuals be made aware of the signs and symptoms of the disease, and when they should seek medical advice.\textsuperscript{12}

As mentioned above, failure to quickly diagnose MSCC is associated with significant morbidity and compromised QoL.\textsuperscript{12, 23} The key investigation for the diagnosis of MSCC is magnetic resonance imaging (MRI) of the spine.\textsuperscript{22} This may indicate existing or impending compression of the spinal cord.\textsuperscript{24}

In addition to the physical effects of a diagnosis of MSCC, individuals can experience disruptions to their social and psychological health.\textsuperscript{25, 26} They can also experience practical needs related to issues like finances and transport.\textsuperscript{26}

**Learning activity**

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<td>1. Outline the evidence-based education strategies you would use to educate a person with cancer on their risk of developing MSCC. Describe the signs and symptoms of MSCC you would tell them to self-monitor for.</td>
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**Recommended intervention strategies**

**Management**

Once a diagnosis of MSCC has been made, treatment goals include:\textsuperscript{22}

- adequate pain relief
- restoration of neurological status if possible
- prevention of further damage through stabilisation of the spine.
Treatment of MSCC should take into consideration the person’s pre-treatment health status, including their ability to ambulate and comorbidities. Palliative radiotherapy remains the cornerstone of treatment for most people with MSCC. Urgent surgical opinion should also be sought for the person with actual or impending MSCC, as evidence has suggested that outcomes are improved with decompressive surgery prior to radiotherapy. People with MSCC are also often treated with corticosteroids, although there is currently limited evidence to support this practice.

More than 50% of individuals with MSCC go on to develop urinary retention and faecal incontinence. Incontinence can have a major impact on QoL. Faecal incontinence is also a leading cause of admittance to a residential aged care facility.

### Superior vena cava syndrome

**Aetiology and contributing factors**

Superior vena cava syndrome (SVCS) is a complication that can arise in people with cancer, especially those with lung cancer or lymphoma. Approximately two to four percent of all people with lung cancer will go on to develop SVCS at some time.

The superior vena cava (SVC) is responsible for the venous drainage of the head, neck, arms, and upper thorax. The SVC has thin walls, and is vulnerable to external compression by tumours arising in the lung or mediastinal area. Tumour invasion, thrombosis, or interference with the venous return can also cause obstruction of the SVC, leading to SVCS. This syndrome is defined by the constellation of symptoms that result from the obstruction of the SCV.

Signs and symptoms commonly associated with SVCS include:

- facial or neck swelling (in 82% of presentations)
- arm swelling (68%)
- dyspnoea (66%)

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<td>1. Discuss the nursing implications of people receiving the following treatments for MSCC:</td>
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<td>- corticosteroids</td>
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<td>- radiation to the spinal cord</td>
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<td>- decompressive surgery</td>
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<td>2. Discuss the evidence-based supportive care you could offer a person with MSCC who is suffering with bowel and bladder dysfunction.</td>
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• cough (50%)
• dilated chest veins (38%).

Swelling is typically described as being worse in the morning, and symptoms of SVCS are generally exacerbated by lying down, bending forward, coughing, or sneezing. All of these actions increase venous pressure.\(^\text{12}\)

The clinical presentation of SVCS may be acute or subacute.\(^\text{29}\) Subacute SVCS may present with minimal or no symptoms and is not considered an oncological emergency. However, 75% of people who present with SVCS have had the symptoms and signs of SVCS for longer than one week before seeking medical advice.\(^\text{29}\) SVCS can be life threatening if there is evidence of respiratory or neurologic compromise due to the obstruction.\(^\text{28}\)

The severity of SVCS depends on the obstruction’s location and how rapid its onset was.\(^\text{29}\) If the obstruction is above the entry of the azygos vein, the venous system can more readily distend to accommodate the movement of the obstructed blood with less venous pressure then developing.\(^\text{29}\) In most cases, because symptoms develop over the course of several weeks, this allows the body to develop collateral circulations to deal with the obstruction.\(^\text{28}\)

Resource link

Review Medlibes online medical library\(^\text{31}\) to see a picture of a person suffering with distension of their veins secondary to SVCO. This may be a presenting symptom of this syndrome.

Learning activity

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<td>1. Review the pathophysiology behind the development of collateral circulation in response to SVC obstruction, and discuss the importance of the obstruction location especially in relation to the azygos vein.</td>
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Assessment and monitoring

People at risk of developing SVCS must receive education to reinforce the importance of monitoring for the signs and symptoms of the syndrome, and what action needs to be taken in the event of these signs or symptoms developing. Early symptoms of SVCS may be subtle and easily ignored, making effective education of those at risk a priority for cancer nurses.\(^\text{16}\)

Confirmation of SVCS by radiological study is not always necessary, but may be helpful. Routine studies include x-ray, CT scan, and MRI.\(^\text{29}\) Histology of the underlying malignancy should also be confirmed, and is typically done via a sputum sample or fine needle aspiration.\(^\text{29}\)
Nursing assessment of SCVS should focus on the patency of the airway and the maintenance of cardiac output. Frequent assessment of the respiratory, cardiac and neurologic systems is required and may include regular arterial blood gas and coagulation studies. Like all people with cancer, those experiencing SVCS may have unmet supportive care needs.

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<td>Activity</td>
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<tr>
<td>☐ 1. Describe the elements of a clinical assessment to identify early signs of SVCS.</td>
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Recommended intervention strategies

Management

Treatment for SVCS should be individualised, and depends on the underlying aetiology of the obstructive process. Ensuring the person’s comfort and safety should be the goal of initial nursing care of SVCS. For the person with SVCS, this may be achieved by:

- providing a calm, quiet environment
- limiting physical activity
- positioning the person so that they are sitting up
- administration of corticosteroids
- providing oxygen therapy to relieve dyspnoea.

The symptoms of SVCS can be distressing for the person and their carers. The nurse is in a position to greatly relieve these fears and concerns through the provision of supportive care.

For the majority of people, SVCS is not immediately life threatening and can be treated conservatively. Radiotherapy has historically been the treatment of choice for SVCS caused by malignancy, with treatment providing complete symptomatic relief to the majority of sufferers. Antineoplastic agents may also reduce tumour bulk and so ease SVCS.

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<tr>
<td>Activities</td>
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<tr>
<td>☐ 1. Outline the rationale behind the administration of corticosteroids to people with SVCS.</td>
</tr>
<tr>
<td>☐ 2. Discuss the surgical treatment options for the management of SVCS, and the nursing implications of this treatment.</td>
</tr>
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</table>
Disseminated Intravascular Coagulation

Aetiology and contributing factors

Disseminated intravascular coagulation (DIC) is characterised by simultaneously occurring widespread microvascular thrombosis, and profuse bleeding from multiple sites.\textsuperscript{32}

DIC is not a disease in, and of, itself, but is always secondary to an underlying disorder.\textsuperscript{32} Common clinical conditions that may be associated with the occurrence of DIC include severe infection, trauma, and malignancy.\textsuperscript{32, 33}

DIC occurs as a result of dysfunctions within the body’s coagulation system.\textsuperscript{34, 35} DIC may be a complication of both solid tumours and haematological malignancies.\textsuperscript{32} There is evidence that some solid tumours may express a specific substance that may initiate the activation of DIC.\textsuperscript{32} In addition, acute promyelocytic leukaemia may trigger a specific form of DIC.\textsuperscript{32}

Bleeding in DIC is caused by the consumption of available pro-coagulants (such as platelets, prothrombin, and fibrinogen) in response to the ongoing, widespread activation of the coagulation system.\textsuperscript{32} This process can lead to the deposition of fibrin in the microcirculation, causing blood clots (thromboses).\textsuperscript{36} Clots are unable to be generated where they are needed, in order to stop haemorrhage due to a lack of effective pro-coagulants.\textsuperscript{36}

In practice, DIC can sometimes be confused with thrombocytopaenic purpura (TTP), as both conditions can cause acute illness associated with multiorgan failure, disseminated thrombosis, and haemorrhagic manifestations.\textsuperscript{37} However, DIC can be differentiated from TTP pathologically in that it causes consumption of clotting factors and interferes with fibrinolysis.\textsuperscript{37}

DIC often causes multiorgan dysfunction, either by haemorrhages occurring in these organs or by clots disrupting the circulation of blood to them.\textsuperscript{34} Multiorgan dysfunction may lead to death. Mortality from DIC depends on the underlying disease causing the syndrome, and the severity of coagulation dysfunction experienced.\textsuperscript{38} Overall, the mortality rate of DIC is between 10 and 50%\textsuperscript{, 38} DIC associated with sepsis has a much higher mortality rate than DIC associated with trauma.\textsuperscript{38}

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Assessment and monitoring

Clinically, individuals with DIC may present with symptoms of blood clots, excessive bleeding, or both.\textsuperscript{34} Clots associated with DIC can lead to tissue necrosis, ischaemia, and organ failure.\textsuperscript{32, 36} Conversely, the individual affected by DIC may present with signs and symptoms of excessive bleeding, including epistaxis, bleeding from wounds, petechiae and ecchymoses.\textsuperscript{36} Because of the nature of DIC, those affected may present with symptoms of both bleeding and excessive clotting.

Below are two images of a person with DIC secondary to infection.\textsuperscript{39} These images come from the New England Journal of Medicine Images in Clinical Medicine series, and are used with permission.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{two_images_of DIC.png}
\caption{Image A shows a purpuric rash. Image B shows the occurrence of retiform purpura on the sole of a foot. Retiform purpura appears in a net-like pattern and is an indication of thrombosed veins.\textsuperscript{39}}
\end{figure}

\textit{Image A shows a purpuric rash. Image B shows the occurrence of retiform purpura on the sole of a foot. Retiform purpura appears in a net-like pattern and is an indication of thrombosed veins.}\textsuperscript{39}


The diagnosis of DIC needs to be based on both clinical and pathological information.\textsuperscript{40} There is no single test that can rule out or confirm DIC.\textsuperscript{40} DIC can progress very quickly and so any assessment done needs to keep pace with the critical nature of this condition.\textsuperscript{40}

Pathologically, DIC causes abnormalities in prothrombin time (PT) and partial thromboplastin time (PTT), thrombocytopaenia, and decreased fibrinogen levels.\textsuperscript{34} People with DIC also generally show increased levels of fibrin degradation products (FDPs).\textsuperscript{34} The whole spectrum of the individual’s pathology results must be considered in diagnosing DIC, as each of these results on their own is not necessarily indicative of the syndrome. For instance, fibrinogen levels can be normal in as many as 57% of people with DIC. Sequential measurements might be more useful when establishing a diagnosis.\textsuperscript{40} Because the coagulation system is dysfunctional in someone with DIC, the risk of thrombosis is not a
function of platelet count, and thrombocytopenia does not necessarily protect the person with DIC from thrombosis.\textsuperscript{34}

The International Society for Thrombosis and Haemostasis (ISTH) provides a \textit{scoring system}\textsuperscript{41} for the objective pathological measurement of DIC. This system differentiates between DIC that is non-overt (where the body is able to compensate well with any derangement in clotting factors) and overt DIC (in which the body is haemostatically compromised).\textsuperscript{42} Use of the ISTH system may be problematic, however, when used in incorrect clinical situations or with illnesses that may mimic DIC.\textsuperscript{34} Clinical assessment of DIC is thus also important in the diagnosis of this syndrome.

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</table>

**Recommended intervention strategies**

**Prevention**

Prompt nursing assessment and management of those at risk of DIC may lead to better outcomes for affected individuals.\textsuperscript{36} For example, DIC may affect up to 50% of people with sepsis.\textsuperscript{36} Prompt recognition and treatment of sepsis may help prevent the processes that trigger the initiation of DIC.\textsuperscript{36}

\textit{See febrile neutropaenia and sepsis evidence summary for more information on these conditions.}

**Management**

Treatment of the underlying cause of DIC is crucial to the long term prognosis of the affected person.\textsuperscript{32,34,40} If the underlying cause is reversible, such as obstetric trauma, then recovery from DIC is likely.\textsuperscript{34} DIC may even spontaneously resolve when this underlying cause is treated.\textsuperscript{40} If the DIC trigger is a chronic or irreversible disease, the resolution of DIC is more difficult and prognosis is much poorer.\textsuperscript{34}

All individuals with DIC require aggressive resuscitation to maintain optimal fluid balance, blood pressure, temperature and serum pH.\textsuperscript{34} Key aspects of supportive treatment for DIC
may include transfusion of blood products, anticoagulant therapy, and restoration of normal anticoagulant pathways.\textsuperscript{35}

Red blood cells, platelets, fresh frozen plasma, and cryoprecipitate have all been used in the treatment of DIC.\textsuperscript{34} Use of blood products should not occur in response to pathology results alone, but may be indicated in individuals with active bleeding, those requiring an invasive procedure, or those otherwise at risk for bleeding complications.\textsuperscript{40}

\textbf{Resource link}

The Australian Red Cross Blood Service (ARCBS) has an overview of DIC on their website, and include current \textit{ARCBS recommendations for use of blood products to manage DIC}.\textsuperscript{43}

Anticoagulants may be used in cases of DIC where thrombosis is the predominant issue.\textsuperscript{40} However, there is a paucity of controlled clinical trials in the use of anticoagulants when managing DIC.\textsuperscript{35} Therapeutic doses of heparin are indicated in individuals with clinically overt thromboembolism.\textsuperscript{35} The benefits of using anticoagulants must be weighed against the risk of them contributing to worsening bleeding.\textsuperscript{35}

Restoration of anticoagulant pathways may include administration of recombinant human activated protein C or antithrombin concentrate.\textsuperscript{35} Further study regarding use of these agents is required to demonstrate their safety and efficacy.\textsuperscript{35}

Nursing management for those at risk of DIC includes regular assessment for signs or symptoms of the condition and supportive care strategies to manage them, including:\textsuperscript{34}

- epistaxis
- bleeding from IV sites, mucous membranes or wounds
- occurrence or worsening of rashes.

Individuals with known DIC are also monitored closely, with collection of serial coagulation panels, to evaluate the effectiveness of interventions and inform any further therapy.\textsuperscript{36}

\textbf{Resource link}

Medscape reference article: \textit{Disseminated intravascular coagulation}.\textsuperscript{35} (This is a free resource, but you have to register and login to access).
## Learning activities

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<thead>
<tr>
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<tr>
<td></td>
<td>1. Access the <a href="#">ARCBS recommendations for use of blood products to manage DIC</a>(^{43}), and summarise the recommendations for the use of:</td>
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<tr>
<td></td>
<td>- platelets</td>
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<td>- red blood cells</td>
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<td>- fresh frozen plasma</td>
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<td></td>
<td>- cryoprecipitate.</td>
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<td>2. Describe the nursing assessment and management of an individual experiencing epistaxis.</td>
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### Hypercalcaemia

#### Aetiology and contributing factors

Hypercalcaemia is a metabolic abnormality that affects up to 30% of people with cancer.\(^{44-46}\) It more commonly occurs in those with advanced cases of the disease.\(^{46}\) In a healthy person, serum calcium is kept within normal levels by homeostatic mechanisms designed to balance the flow of calcium between bone, kidneys, intestines, and extracellular fluid.\(^{46}\) Calcium is released from food, and from the normal breakdown of bones by osteoclasts.\(^{44}\) In what is normally a continuous cycle, osteoblasts then utilise calcium when rebuilding new bone.\(^{44}\) Excess calcium is excreted by the kidneys.

Hypercalcaemia occurs when normal homeostatic mechanisms are overwhelmed.\(^{46}\) In hypercalcaemia associated with malignancy, excessive amounts of calcium are released from bones as a result of abnormal bone loss, and the kidneys are unable to ‘keep up’ with the amount of calcium that needs to be excreted.\(^{46}\)

There are many factors that may cause bone loss in people with cancer. The major cause is the presence of bone metastases.\(^{47}\) Certain malignancies are more commonly associated with bone loss. These include prostate cancer, breast cancer, and multiple myeloma.\(^{47}\) Bone metastases affect up to 75% of men with advanced prostate cancer, and up to 75% of women with advanced breast cancer.\(^{47}\) Bone lesions are seen in up to 100% of people with multiple myeloma.\(^{47}\) Bone loss in those with cancer may also be related to their age, and to cancer treatments.\(^{47}\) Common treatments for advanced prostate cancer can themselves cause bone loss.\(^{47}\)

#### Assessment and monitoring
Symptoms of hypercalcaemia may be non-specific and easily confused with those of the underlying cancer or its treatment.\textsuperscript{45, 46} Consequently, it is important to consider the possibility of hypercalcaemia in any person with suggestive symptoms.\textsuperscript{46}

The effects of hypercalcaemia are systemic and produce a wide range of symptoms. These include:\textsuperscript{45, 46}

- renal dysfunction (possibly indicated by polyuria and/or polydipsia)
- effects on the gastrointestinal system (anorexia, nausea, vomiting, constipation)
- cardiac arrhythmias
- central nervous system (CNS) abnormalities (confusion, seizures, muscle weakness)
- generalised malaise and fatigue.

Individual responses to hypercalcaemia can be variable, but most people affected will display at least some symptoms.\textsuperscript{44} If these symptoms are not recognised, the person affected will progressively become more unwell.\textsuperscript{44} By recognising symptoms in the early stages, nurses may be able to facilitate improved outcomes for those affected by hypercalcaemia.\textsuperscript{44}

The diagnosis and monitoring of hypercalcaemia is done pathologically, by examining the total serum calcium values and adjusting for albumin concentrations.\textsuperscript{46} Renal function should also be monitored in those with hypercalcaemia, and ECGs performed to ensure no cardiac abnormalities are occurring.\textsuperscript{45} In some individuals, hypercalcaemia is the presenting symptom of cancer and they require a full work up to diagnose the type of malignancy and the presence of any bone metastases.\textsuperscript{45}

**Recommended intervention strategies**

**Prevention**

Comprehensive cancer care should include recognition of the importance of the bone health of people affected by cancer.\textsuperscript{47} Providing effective education to those at risk of hypercalcaemia will assist in highlighting the symptoms they should self-monitor for, and may help ensure rapid diagnosis and treatment.\textsuperscript{44}

The widespread use of prophylactic bisphosphonates for those with known bone metastases (in order to prevent skeletal events) has probably contributed to a reduction in the incidence rate of hypercalcaemia, though this is impossible to measure.\textsuperscript{45}

**Management**

Effective management of hypercalcaemia may improve symptoms for people affected by cancer, and may even prolong their overall survival.\textsuperscript{45, 46} The first step to managing hypercalcaemia is to treat the underlying malignancy.\textsuperscript{46} In some cases it is also necessary to administer antihypercalcaemic therapy while waiting for antitumour treatments to work, or in those for whom cancer treatment is unavailable or ineffective.\textsuperscript{46}
Antihypercalcaemic treatment may include rehydration. Dehydration – secondary to anorexia or vomiting – may occur as a result of cancer treatments and can worsen hypercalcaemia.\textsuperscript{46} Hypercalcaemia can also lead to worsening dehydration by impairing urinary concentrating ability, while promoting water excretion.\textsuperscript{46} Rehydration should therefore be considered in all people with hypercalcaemia.\textsuperscript{46}

Another common antihypercalcaemic treatment is the use of bisphosphonates. Bisphosphonates work to inhibit bone resorption by causing apoptosis of osteoclasts.\textsuperscript{46, 47} Bisphosphonates are generally the antihypercalcaemic treatment of choice and many different kinds have been used.\textsuperscript{46}

Other less common treatments for hypercalcaemia include calcitonin, phosphate, and antitumour antibiotics, but these treatments have generally been superseded by the use of bisphosphonates.\textsuperscript{46}

Discontinuing other treatments that may increase serum calcium is also necessary for effective treatment of hypercalcaemia.\textsuperscript{45} This may include stopping any calcium supplementation, thiazide diuretics, or lithium.\textsuperscript{45}

Nurses have an important role to play in supporting the individual affected by hypercalcaemia, and in managing the side effects of this illness.\textsuperscript{44} Close observation is often necessary in those suffering with cardiac or CNS dysfunction secondary to hypercalcaemia.\textsuperscript{44}

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<tr>
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<tr>
<td>□ 1. Outline the normal ranges and significance of the following blood tests in hypercalcaemia:</td>
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<tr>
<td>□ • serum calcium</td>
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<td>□ • corrected calcium</td>
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<td>□ • creatinine.</td>
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<tr>
<td>□ 2. Develop a care plan for a person with hypercalcaemia. Discuss the rationales for nursing interventions with your mentor/ facilitator.</td>
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<tr>
<td>□ 3. Discuss the core components of an education plan for the person affected by cancer who is at increased risk of developing hypercalcaemia.</td>
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Managing hazards in the delivery of cancer care

Principles of radiation safety

Radiation safety principles aim to limit exposure to ionising radiation for radiation therapy personnel, people affected by cancer and the general public. Wherever there is known risk of exposure to ionising radiation, health professionals must be guided by the ALARA (as low as reasonably achievable) principles of radiation safety for time, distance and shielding.\(^{48,49}\)

**Time**

*The less time spent near a radiation source, the less radiation absorbed.*

This is especially important for personnel such as radiation therapists and physicists preparing radioactive sources, and for nursing staff when caring for individuals who have a radioactive source in a body tissue or cavity. In the case of inpatients, nurses should restrict direct contact to 30 minutes per 8-hour shift.\(^{49}\)

**Distance**

The inverse-square law states that radiation exposure and distance are inversely related. That means that as the distance from the source increases, the intensity of radiation decreases.\(^{50}\)

**Shielding**

The appropriate selection of a shielding device is dependent on the range of emission of the radioactive source and type of isotope. Standard shielding devices include lead aprons, thyroid shields, and eye shields. Rooms that house x-ray generating equipment are shielded using specified materials. Radioactive sources need to be transported by licensed personnel in lead containers.\(^{49}\) Brachytherapy procedures are undertaken in a specialised unit or ward with appropriate facilities, and individuals are generally isolated in a single room.

Departments are designed with radiation protection and shielding at the forefront of planning. Radiation therapy workers are required to wear thermoluminescent dosimetry (TLD) badges, monitored by regulatory authorities to measure radiation exposure. Other radiation measurement devices such as Geiger counters are used to monitor areas where radioactive sources are used. Appropriate signage must be in place in the presence of any radioactive substance, and education and information provided to all relevant individuals.\(^{48,49}\)
Spill management

In the event of a radiation incident, such as the loss of a source or a spill, appropriate procedures and notifications must be followed. These should be clearly outlined in the clinical environment as part of radiation safety and hospital policy.

After ingestion of a radioactive substance, 'spills' generally refer to the loss of body fluid – either urine or vomit – and can be classified as major or minor. A significant amount of fluid loss (vomit or urine) within the first 24 hours would be defined as a major spill.51

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| Completed           | 1. Summarise how the ALARA principles are implemented in the care of individuals after the following treatments:  
- iodine-131 swallow for thyroid cancer  
- permanent seed implants in the prostate  
- caesium-137 insert for cervical cancer using a remote afterloading device. |
|                     | 2. Refer to your local policy and procedures and outline spill management for a radioactive substance. |
|                     | 3. Identify possible risks in your facility for exposure to ionizing radiation. |
|                     | 4. Identify key content for an education program for new cancer care staff to prevent exposure to radiation. |
Principles for cytotoxic safety

Exposure to antineoplastic agents poses a potential health risk to staff who:
- prepare, handle, or administer the drugs
- care for individuals following administration
- dispose of these drugs or related waste.

Many antineoplastic agents, proven to be carcinogenic, mutagenic and teratogenic, are classified as hazardous substances. Direct exposure to antineoplastic agents can occur during administration or handling, and involves inhalation, ingestion or absorption.\(^{52-54}\)

Safe levels of occupational exposure to hazardous agents and a reliable method of monitoring exposure have proven difficult to determine.\(^{55}\) The health risk of any procedure involving antineoplastic agents stems from the inherent toxicity of the drug and the extent to which individuals are exposed.

Health professionals working with antineoplastic agents are directed by guidelines, policies, and procedures to ensure maintenance of standards of care and to reduce occupational exposure.\(^{56}\)

Risk assessment and quality assurance are key elements of safe practice associated with antineoplastic agents. Systems, policies and procedures are necessary to assist the reporting of adverse events, incidents and near misses. Identification of 'error prone' practices may indicate the need for practice modification.\(^{56}\)

The *Guidelines for the Safe Prescribing, Supply and Administration of Cancer Chemotherapy*\(^{56}\) is a national document developed to oversee the safe practices associated with management of antineoplastic agents used in the treatment of cancer. This document should be used as a guidance tool to inform local practice and be adapted according to local service needs. To prepare nurses to administer antineoplastic agents, educational programs should include both theoretical and supervised clinical experience.\(^{56}\) Regular assessment of nurses' competence should occur to ensure theory and practice remains evidence based, and to help prevent errors in administration.\(^{57}\)
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<tr>
<td>Access your state or territory policy document guiding practice with antineoplastic agents (examples below), and your own institution's policy and procedure for handling cytotoxic substances.</td>
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<tr>
<td>1. Appraise the current policy and procedures for safe handling of cytotoxic waste in your facility in light of these documents.</td>
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<tr>
<td>2. Outline the key elements of an in-service program for nurses new to cancer control on safe handling of antineoplastic agents and their waste products.</td>
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<td>3. Outline the principles of safe practice you would apply when advising a person regarding cytotoxic precautions in their home and community.</td>
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<td>4. Discuss strategies used to ensure cytotoxic safety for the following groups and individuals:</td>
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<td>5. Using a local tool, demonstrate required knowledge and skills for safe practice when there is potential for exposure to antineoplastic agents and cytotoxic waste.</td>
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- *Hazardous and Cytotoxic Drugs Administration and Handling.*
- *SHPA Standards of Practice for the Transportation of Cytotoxic Drugs from Pharmacy Departments.*
Central Venous Access Devices (CVADs) in cancer care

Central venous access devices (CVADs) have become an integral component of delivering intravenous therapy in the specialty field of cancer. CVADs provide reliable venous access over a long period of time and have enhanced the quality of life of people affected by cancer, allowing many to receive ambulatory outpatient care as well as the inpatient setting.\textsuperscript{58}

Nurses are pivotal in facilitating the safe management of individuals with CVADs and decreasing the risk of complications. It is imperative that cancer nurses possess theoretical knowledge and clinical skills regarding:\textsuperscript{58}
- anatomical placement
- clinical indications
- types of CVADs and the advantages and disadvantages associated with each device
- device selection criteria
- care and maintenance principles
- prevention, detection and management of complications
- accessing and de-accessing of devices applicable to their clinical practice.

Anatomical placement for CVADs

CVADs are all positioned within the central circulation system. The ideal anatomical placement is in the lower third of the Superior Vena Cava (SVC) near the juncture within the Right Atrium. At this point, the catheter tip is free floating in the lumen of the SVC parallel to the vessel walls. This anatomical placement reduces the risk of thrombosis and infection. Any type of infusate can be infused safely because of the high rate of blood flow returning through the SVC to the right side of the heart, providing adequate haemodilution whilst reducing venous irritation.\textsuperscript{58}

Clinical Indications

Indications for use of CVADs include:\textsuperscript{58}
- administration of long term therapies
- continues infusion of antineoplastic agents
- administration of
  - vesicant antineoplastic agents
  - parenteral nutrition
  - other hyperosmolar solutions to decrease damage to peripheral veins
- apheresis procedures
- emergency situations.

Types of CVADs
Different CVADs have unique characteristics and advantages and disadvantages associated with their use. Management of devices also differs between types.

CVADs are able to be classified into three categories:

- **Non – Tunnelled**
  - Central Venous Line – Percutaneous
  - Peripherally inserted Central Catheter (PICC)
  - Vascath

- **Tunnelled**
  - Hickman Catheter

- **Totally Implanted**
  - Port-a-cath.

Tip configurations include open ended single or multi-lumen devices, valved catheters, for example, Groshong and staggered tips. The tip configuration generally determines the type of solution that is required to lock the device.

It is imperative that device selection is discussed by all key stakeholders including the treating doctor, nursing staff, the person affected by cancer and other members of the health care team. Nurses need to support individuals to make informed decisions regarding which CVAD is appropriate for their circumstances and their planned treatment regimen.

Guidelines do not exist for the appropriate selection of CVADs however the following key factors should be considered:

- frequency and duration of therapy
- number of blood collections required
- therapy type, for example; administration of vesicant agents
- supportive therapy requirements; for example, total parenteral nutrition or systemic antibiotics
- need for peripheral stem cell collection, plasmapheresis and reinfusion of peripheral stem cells or bone marrow
- individual preference.

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**Resource link**


*Centre for Healthcare Related Infection Surveillance and Prevention (CHRISP)*

*eviQ Cancer Treatments Online*
Learning activities

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<tr>
<td></td>
<td>1. Identify the common uses for CVADs in your local facility.</td>
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</table>
|           | 2. Develop an in-service program for nurses in your clinical practice setting regarding the various types of CVADs taking into consideration:  
  - Characteristics of device  
  - Advantages  
  - Disadvantages  
  - Management |
|           | 3. Describe how a Groshong valve works to reduce the risk of catheter occlusion, air embolus and the need for heparin. Draw a picture of the valve system to demonstrate understanding. |

Insertion of CVADs

Many CVADs are now inserted in radiology departments by a radiologist. In some settings, nurses educated and trained in the insertion of PICCs undertake this procedure. Conscious sedation is used in many CVAD insertion procedures. Conscious sedation is a drug-induced depression of consciousness during which the person can respond purposefully to verbal commands or tactile stimulation.

Education of the individual and their carer should commence before the device is inserted and be reinforced regularly. Information provided should include:

- the rationale, the risks and the benefits of the CVAD
- self management of the CVAD to a level appropriate for their needs
- signs and symptoms of CVAD related complications
- who to contact if they have concerns and how to contact them.

The management of the individual undergoing a procedure to insert a CVAD involves:

- gaining written consent for the procedure and the sedation (if sedation is planned)
- preparing the person for the procedure (assessment, fasting, review of pathology, administration of blood products and pre-medications as required).

Following catheter insertion, radiological examination (e.g. chest X-ray) should be obtained to:
• verify catheter placement
• detect adverse events
• provide record of placement.

The anatomical placement of the catheter tip must be documented and checked prior to the initiation of any therapy through the device.⁶²

### Learning activities

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|           | 1. Refer to your local policy and procedures and the CNSA *Central Venous Access Devices: Principles of Nursing Practice and Education*.  
  • Develop a care plan for an individual undergoing a procedure to have a CVAD inserted.  
  • Outline the rationale for the following prior to insertion of a CVAD  
    o Antibiotics  
    o Platelets  
| ☐         | 2. Describe the information and supportive care needs of a person and their carer pre insertion of a CVAD and the nursing responses to their needs. |
| ☐         | 3. You are caring for a person who is having a Hickman tunnelled catheter inserted. He swims daily in the local public pool and asks if he will be able to continue to do this while the Hickman catheter is insitu. What information and advice would you provide to him? |

### Care and maintenance principles

All facilities caring for people who have a CVAD should have specific evidence based policies and procedures which undergo a robust review and evaluation process.⁵⁸

The care and maintenance of CVADs differs between facilities. Some areas of CVAD management remain contentious or unclear despite a vast amount of research and debate. These include:⁵⁸

• most appropriate skin antiseptic
• appropriate cleansing of needleless access caps
• CVAD dressing requirements, i.e type and frequency of changing
• securement devices
• flushing techniques
• flushing and locking solutions.

There are a wide variety of complications that can occur with CVADs. Early identification of problems and prompt management will ensure safety and also preserve the device to
ensure ongoing delivery of the individual’s planned treatment regimen. Complications can include:\(^{58}\)

- infection
- occlusion
- CVAD-related thrombosis
- air embolism
- infiltration and extravasation
- cardiac tamponade
- dysrhythmias
- CVAD tip migration
- catheter damage.

The removal of a CVAD should only be performed by an appropriately educated and trained health care practitioner. If the device is being removed due to suspected or confirmed infection, the tip may be cut off using a sterile procedure and sent for culturing.\(^{63}\) On removal of the CVAD, the health care practitioner should check the catheter’s integrity and length to ensure removal of the entire device.\(^{63}\) Following removal, digital pressure should be exerted over two sites – the vein insertion area and the exit wound – until haemostasis is achieved.\(^{58}\) Following removal, nurses should monitor the site and implement interventions as required.\(^{58}\)
### Learning activities

<table>
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<tr>
<th>Completed</th>
<th>Activities</th>
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|           | 1. Appraise current policy and procedures in your facility in light of national and state guidelines (see Resource link) and discuss the variables in practice with your resource person.  
  - PICC dressing  
  - Hickman Catheter Dressing  
  - POC accessing and dressing  
  - Flushing of CVADs |
|           | 2. Identify two contributing factors for the development of catheter related infections. |
|           | 3. Name two common infective organisms. |
|           | 4. List three signs and symptoms which would indicate a CVAD infection. |
|           | 5. Identify clinical practicies undertaken to prevent CVAD infections. |
|           | 6. You are required to collect a blood sample from a person with a totally implantable CVAD (port-a-cath). When you attempt to aspirate blood you are unsuccessful; however, you are able to flush the catheter. Describe what actions you would take? Identify what the possible reasons may be for your inability to aspirate blood. |
|           | 7. Describe three types of thrombotic occlusion and how they may arise. |
|           | 8. Identify how to prevent and manage damage to a CVAD. |
|           | 9. Access and review the [EdCaN Competency Assessment Tool](#) or local competency/skills based assessment tool for Management of CVADs. In collaboration with your education support staff, develop a plan for a period of supervised practice to develop competence in management of CVADs. Use the Competency Assessment Tool as a guide for your supervised practice. |
References


